

## ABSTRACT OF THE DISCLOSURE

~~(reduced word count to 188 — does it need to be no more than 150?)~~

An agile ~~Agile~~ frequency converter and method, employs a novel IF-RF level exchange process, and novel notch filtering techniques, to reduce the system ~~System~~ noise and spurious levels generated by the channel frequency conversion is reduced process in applications that further ~~require~~ requiring broadband combining of many such frequency converters to form a multichannel composite signal. The converter ~~Converter~~ employs a well-known two-stage frequency conversion process, with a novel gain exchange system using variable pre-mixer gain and variable post-mixer attenuation that complements the pre-mixer gain so as to maintain a constant RF output signal power level. Because such IF-RF level exchange results in an increased power level of certain higher order distortion components generated by the mixing process, the converter also employs tunable notch filters for purposes of filtering the higher order distortion components to ensure the carrier-to-distortion (C/D) specification is still met. For those few conversion frequencies where the higher order distortion component(s) cannot be filtered without degrading the desired signal, the IF-RF level exchange is optimized for meeting the carrier-to-distortion (C/D) ~~C/D~~ ratio specifications at the slight expense of the noise level for that channel only, while still meeting the aggregate combined carrier-to-noise (C/N) specification requirements. The optimal ~~Optimal~~ apportionment of such level exchange for each channel depends on the specific frequency rejection capability of the spurious components and is thus matched to that filtering capability and stored within a non-volatile memory of a microcontroller used in the frequency converter, of the present invention. This results in improvements in the overall C/N and C/D ratios of the frequency converter. In one embodiment of the invention, the tunable notch filters employ two varactors in opposition to one another with respect to signal direction to eliminate first order parametric distortion in the transfer function of the filters.

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